

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): An intermediate board comprising: an intermediate board body having first and second faces wherein a semiconductor device is to be mounted on at least one of said first and second faces, said semiconductor device having a coefficient of thermal expansion that is equal to or larger than 2.0 ppm/°C and smaller than 5.0 ppm/°C, and having surface mount terminals, said intermediate board body having a plurality of through holes through which said first and second faces communicate with each other, said intermediate board body ~~containing an inorganic insulating material~~ comprising a low temperature-firing ceramic which is obtained by firing at a temperature which is lower than 1,000 °C, wherein the low temperature-firing ceramic has a coefficient of thermal expansion which is greater than the coefficient of thermal expansion of the semiconductor device; and a plurality of conductor columns filling said through holes and containing a conductive metal, said conductor columns being to be connected with said surface mount terminals.

2. (original): The intermediate board according to claim 1, wherein said through holes have a diameter which is equal to or smaller than 125 μm , and a minimum center-to-center distance between adjacent ones of said through holes is equal to or smaller than 250 μm .

3. (currently amended): The intermediate board according to claim 1, wherein ~~said inorganic insulating material is low temperature firing ceramic, and~~ said conductive metal is at least one of copper and silver.

4. (original): The intermediate board according to claim 1, wherein a metallization layer is formed on an inner wall of each of said through holes.

5. (currently amended): The intermediate board according to claim 1, wherein ~~said inorganic insulating material is~~ low temperature-firing ceramic ~~which~~ cannot be fired

simultaneously with a metal material, and a metallization layer is formed on an inner wall of each of said through holes.

6. (currently amended): The intermediate board according to claim 1, wherein ~~said intermediate board body is made of alumina or low temperature firing ceramic,~~ and a thickness of said intermediate board body is 0.1 to 0.8 mm.

7. (canceled).

8. (original): The intermediate board according to claim 1, wherein at least one side of said semiconductor device is equal to or larger than 10.0 mm.

9. (currently amended): The intermediate board according to claim 1, wherein ~~said intermediate board body is made of a material which~~ low temperature-firing ceramic is higher in rigidity than at least silicon.

10. (currently amended): The intermediate board according to claim 1, wherein ~~said intermediate board body is made of a material having~~ low temperature-firing ceramic has a Young's modulus of 100 GPa or higher.

11. (currently amended): The intermediate board according to claim 1, wherein ~~said inorganic insulating material is ceramic,~~ and said conductive metal is at least one refractory metal selected from tungsten, molybdenum, tantalum, and niobium.

12. (currently amended): An intermediate board with a semiconductor device, comprising: a semiconductor device having a coefficient of thermal expansion that is equal to or larger than 2.0 ppm/°C and smaller than 5.0 ppm/°C, and having surface mount terminals; and an intermediate board according to claim 1; ~~having an intermediate board body having first and second faces~~

wherein said semiconductor device is mounted on said first or second face, ~~said intermediate board body having a plurality of through holes through which said first and second faces communicate with each other, said intermediate board body containing an inorganic insulating material; and a plurality of conductor columns filling said through holes and~~

~~containing a conductive metal~~, said conductor columns ~~being~~ are connected with said surface mount terminals.

13. (original): The intermediate board with a semiconductor device according to claim 12, wherein said through holes have a diameter which is equal to or smaller than 125 μm , and a minimum center-to-center distance between adjacent ones of said through holes is equal to or smaller than 250 μm .

14. (currently amended): The intermediate board with a semiconductor device according to claim 12, wherein ~~said inorganic insulating material is low temperature-firing ceramic~~, and said conductive metal is at least one of copper and silver.

15. (original): The intermediate board with a semiconductor device according to claim 12, wherein a metallization layer is formed on an inner wall of each of said through holes.

16. (currently amended): The intermediate board with a semiconductor device according to claim 12, wherein ~~said inorganic insulating material is~~ low temperature-firing ceramic ~~which~~ cannot be fired simultaneously with a metal material, and a metallization layer is formed on an inner wall of each of said through holes.

17. (currently amended): The intermediate board with a semiconductor device according to claim 12, wherein ~~said intermediate board body is made of alumina or low temperature-firing ceramic~~, and a thickness of said intermediate board body is 0.1 to 0.8 mm.

18. (canceled).

19. (original): The intermediate board with a semiconductor device according to claim 12, wherein at least one side of said semiconductor device is equal to or larger than 10.0 mm.

20. (currently amended): The intermediate board with a semiconductor device according to claim 12, wherein ~~said intermediate board body is made of a material which~~ said low temperature-firing ceramic is higher in rigidity than at least silicon.

AMENDMENT
U.S. Appln. No. 10/802,782

21. (currently amended): The intermediate board with a semiconductor device according to claim 12, wherein said ~~intermediate board body is made of a material having~~ low temperature-firing ceramic has a Young's modulus of 100 GPa or higher.

22. (currently amended): The intermediate board with a semiconductor device according to claim 12, wherein ~~said inorganic insulating material is ceramic, and~~ said conductive metal is at least one refractory metal selected from tungsten, molybdenum, tantalum, and niobium.

23. (currently amended): A substrate board with an intermediate board, comprising: a substrate board having a coefficient of thermal expansion that is equal to or larger than 5.0 ppm/°C, and having surface mount pads; and ~~an~~ the intermediate board according to claim 1;

~~having: an wherein said intermediate board body having a first face and a second face which is mounted on a surface of said substrate board, said intermediate board body having a plurality of through holes through which said first and second faces communicate with each other, said intermediate board body containing an inorganic insulating material; and a plurality of conductor columns filling said through holes and containing a conductive metal, said conductor columns being~~ are connected with said surface mount pads.

24. (currently amended): The intermediate board with a semiconductor device according to claim 23, wherein said ~~intermediate board body is made of a material which~~ low temperature-firing ceramic is lower in coefficient of thermal expansion than said substrate board.

25. (currently amended): A structural member comprising: a semiconductor device having a coefficient of thermal expansion that is equal to or larger than 2.0 ppm/°C and smaller than 5.0 ppm/°C, and having surface mount terminals; a substrate board having a coefficient of thermal expansion that is equal to or larger than 5.0 ppm/°C, and having surface mount pads; and ~~an~~ the intermediate board according to claim 1;

~~having: an intermediate board body having a first face on which~~ wherein said semiconductor device is mounted on said first face of said intermediate board body, ~~having a~~

said second face ~~which~~ of said intermediate board body is mounted on a surface of said substrate board, and ~~having a plurality of through holes through which said first and second faces communicate with each other, said intermediate board body containing an inorganic insulating material; and a plurality of conductor columns filling said through holes and containing a conductive metal;~~ said conductor columns ~~being~~ are connected with said surface mount terminals and said surface mount pads.

26. (withdrawn-currently amended): A method for producing ~~an~~ the intermediate board according to claim 1, ~~said intermediate board comprising: an intermediate board body having first and second faces wherein a semiconductor device is to be mounted on at least one of said first and second faces, said semiconductor device having a coefficient of thermal expansion that is equal to or larger than 2.0 ppm/degree. C. and smaller than 5.0 ppm/degree. C., and having surface mount terminals, said intermediate board body having a plurality of through holes through which said first and second faces communicate with each other, said intermediate board body containing an inorganic insulating material; and a plurality of conductor columns which filling said through holes and containing a conductive metal, said conductor columns being to be connected with said surface mount terminals, wherein said method comprises: a green body producing step of producing a ceramic green body having said through holes; a metal filling step of filling said through holes with said conductive metal; and a cofiring step of heating and sintering said ceramic green body and said conductive metal.~~

27. (withdrawn-currently amended): A method for producing ~~an~~ the intermediate board according to claim 1, ~~said intermediate board comprising: an intermediate board body having first and second faces wherein a semiconductor device is to be mounted on at least one of said first and second faces, said semiconductor device having a coefficient of thermal expansion that is equal to or larger than 2.0 ppm/degree. C. and smaller than 5.0 ppm/degree. C., and having surface mount terminals, said intermediate board body having a plurality of through holes through which said first and second faces communicate with each other, said intermediate board body containing an inorganic insulating material; and a plurality of conductor columns filling said through holes and containing a conductive metal, said conductor columns being to be~~

AMENDMENT

U.S. Appln. No. 10/802,782

~~connected with said surface mount terminals,~~ wherein said method comprises: a first firing step of firing a ceramic green body to produce said intermediate board body; a metal filling step of filling said through holes of said intermediate board body with said conductive metal; and a second firing step of firing said filled conductive metal to form said conductor columns.

28. (new): The intermediate board according to claim 1, wherein the low temperature-firing ceramic has a coefficient of thermal expansion of about 5.5 ppm/°C.